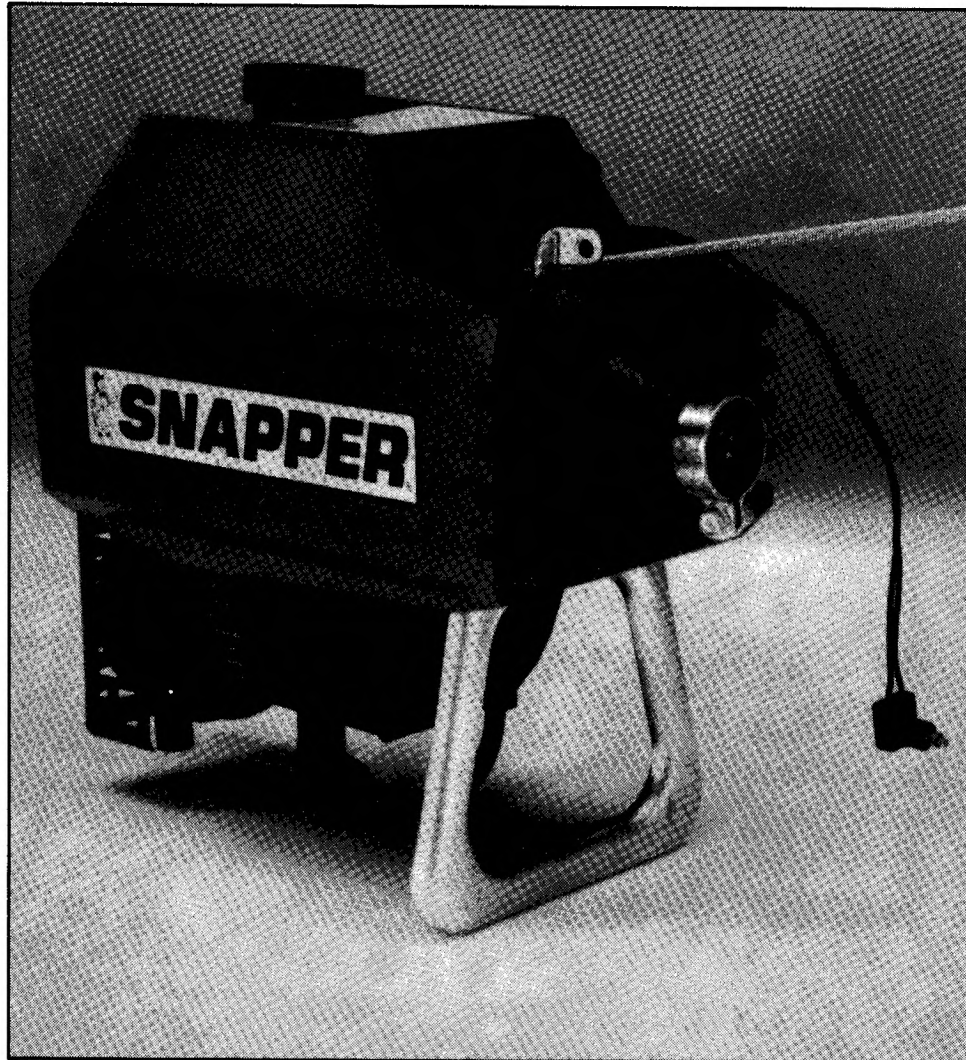


# **SNAPPER®**

## **MODEL 310 & 311 TRIMMER ENGINE**



**SNAPPER POWER EQUIPMENT**  
McDonough, GA • 30253



**MANUAL # 07115**

# SNAPPER®

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## Section I AIR FILTER & CHOKE BASE

### Caution:

Before proceeding with engine disassembly empty all fuel from the fuel tank. Remove the spark plug. For re-assembly all parts of questionable condition should be replaced with new parts.

1.1 Remove air filter cover by depressing top and bottom of cover between your fingers thus releasing the locking tabs.



FIGURE 1.1

1.2 The foam air filter can be removed from the air filter cover. Wash the filter and cover in solvent or soapy water. Allow to dry. Saturate filter thoroughly with light oil. Squeeze excess oil from the filter and re-install it into the air filter cover.

1.3 Take out the two screws mounting the choke base. Note the placement of the spring washer under the choke lever (fingers out) for re-assembly. Wash in solvent or soapy water. Re-assemble lever and spring washer onto choke base by re-installing the screws through the holes and set aside until final re-assembly.

1.4 To re-assemble the choke base onto the engine, care should be taken not to cross-thread the screws. With the choke base assembly and screws in position turn the screws backwards (counter-clockwise) until you feel the thread drop into place, then proceed to tighten by turning clockwise. Tighten the screws to 40 Inch pounds torque.

## Section II CARBURETOR

2.1 With the air filter and choke base removed (ref. section 1) remove the throttle cable from the carburetor throttle arm. Using a screw driver carefully remove the fuel line from the carburetor.

### 2.2 CARBURETOR DISSASSEMBLY

The carburetor has two main areas of concern. As viewed from the rear the right side is the fuel pump and filter side. The left side is the metering side.

#### 2.2A FUEL PUMP AND FILTER SIDE

Remove the screw centered on the cover plate of the filter side. Care should be taken in removing the plate not to damage the gasket or the fuel pump diaphragm. Note for re-assembly the arrangement of gasket outside, diaphragm inside against the carburetor body. See Figure 2.1.

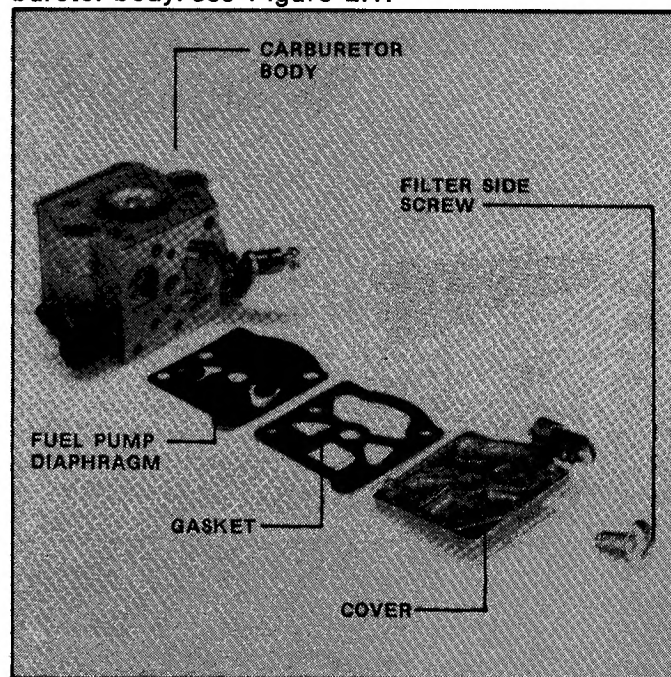
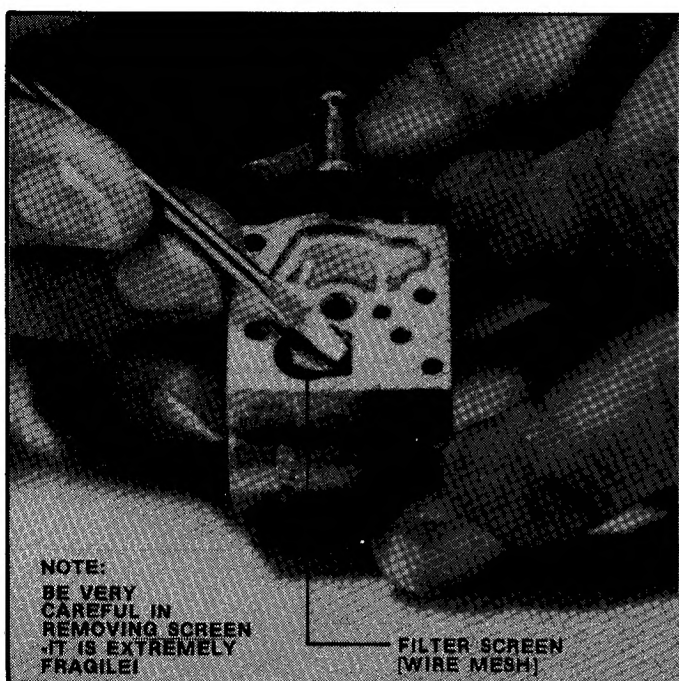


FIGURE 2.1

B. Carefully remove and visually inspect the gasket and the diaphragm. The gasket should show no breaks or deformities. The diaphragm should be inspected for flatness and continuity with no holes. The flapper valves in the diaphragm should be flat and free from curling.

C. Thoroughly clean the cover plate with solvent wash and air gun. Blow through the internal pulse hole of the cover to insure that there are no obstructions.

D. The filter screen can now be removed from the carburetor body using the sharp point of a needle or knife and working it against the inside edge in an upward motion. Do not pry between the outside edge and the carburetor body. This practice would result in deforming the filter screen. See Figure 2.2.

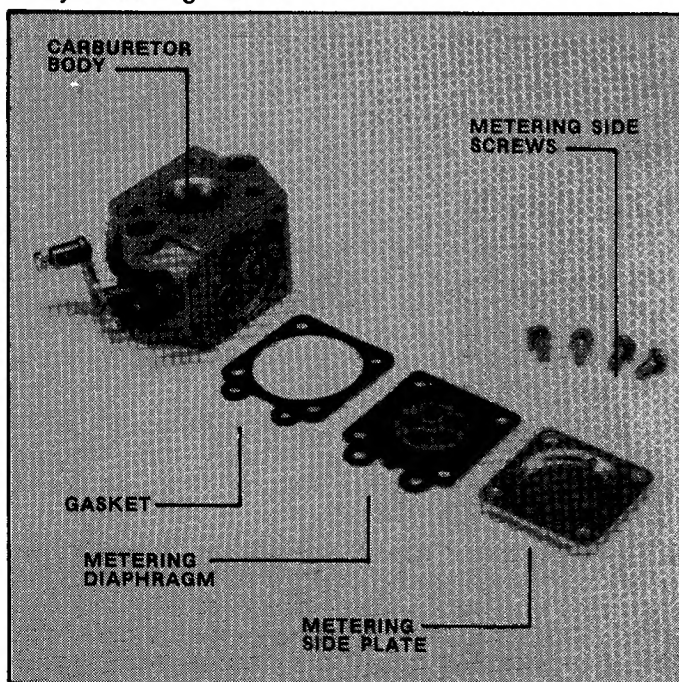


**FIGURE 2.2**

E. Wash the filter screen with solvent and blow clean with air gun from the inside surface outward.

## 2.2B METERING SIDE

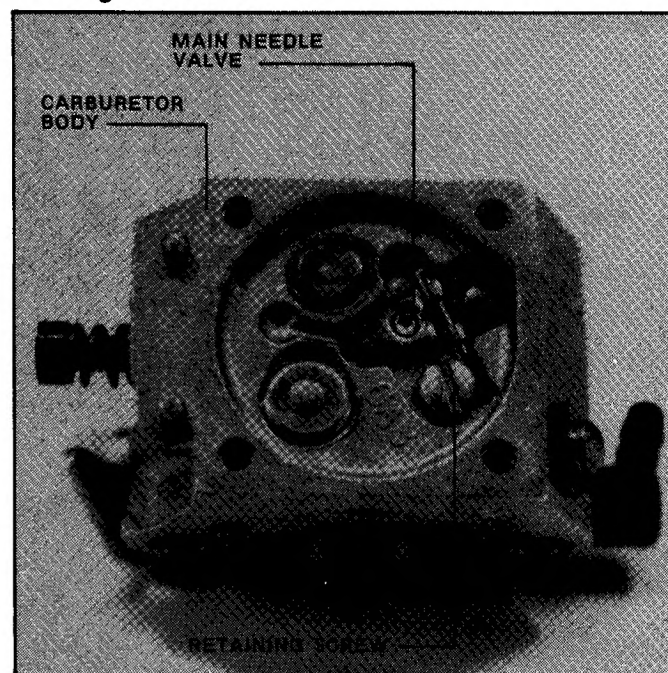
A. Remove the four screws in the metering side plate. Care should be taken in removing the plate not to damage the gasket or the metering diaphragm. Note for re-assembly the placement of the diaphragm outside with its small metal center facing out and the gasket inside against the carburetor body. See Figure 2.3.



**FIGURE 2.3**

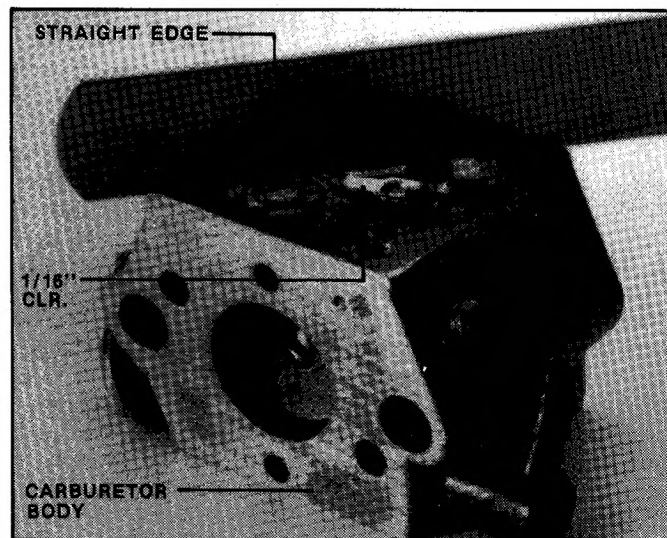
B. With the metering diaphragm and gasket removed clean and inspect for damage. The diaphragm should be free of holes and debris. The gasket should show no breaks or deformities.

C. The main needle valve can now be removed from the carburetor body. Being careful not to loose the spring retained under the lever, remove the screw retaining the lever pin. Remove the lever, pin, spring and needle valve. Care should be taken not to damage the point of the needle valve or distort the spring See Figure 2.4.



**FIGURE 2.4**

D. Note for re-assembly of the needle valve and lever group, the lever end should be adjusted to 1/16" below the level of the outside surface of the carburetor body. See Figure 2.5.

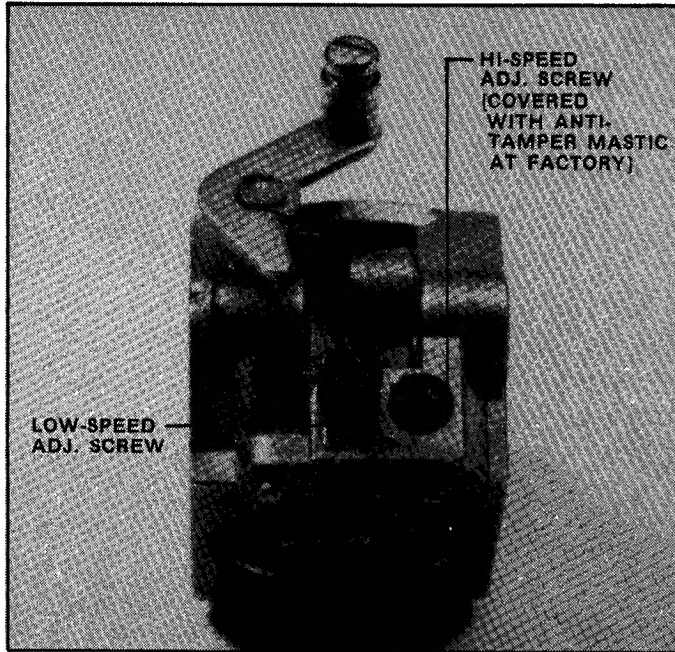


**FIGURE 2.5**



**Section III**  
**Carburetor Mount and Reed Assembly**

2.3 On the top left side of the carburetor body are located the low speed and high speed adjustment screws. These are marked on the carburetor body as "L" and "H". The high speed screw is covered with silicon patch at the factory. Remove the silicon and then remove the two screws with their springs. Notice for re-assembly the long screw and long spring are for the low speed adjustment side. See Figure 2.6.



**FIGURE 2.6**

To re-assemble, seat screws gently and back out 1 and 1/4 turns for initial adjustment.

2.4 Thoroughly clean the carburetor body with solvent and air gun removing all debris. Give special attention to all small openings and orifices.

Dry the carburetor body with air and inspect the operation of the throttle valve and lever.

2.5 Re-assemble the carburetor in reverse order of disassembly. Replace all damaged and questionable parts. Replacement parts kits are listed below.

**A. O.E.M. Repair Kit**

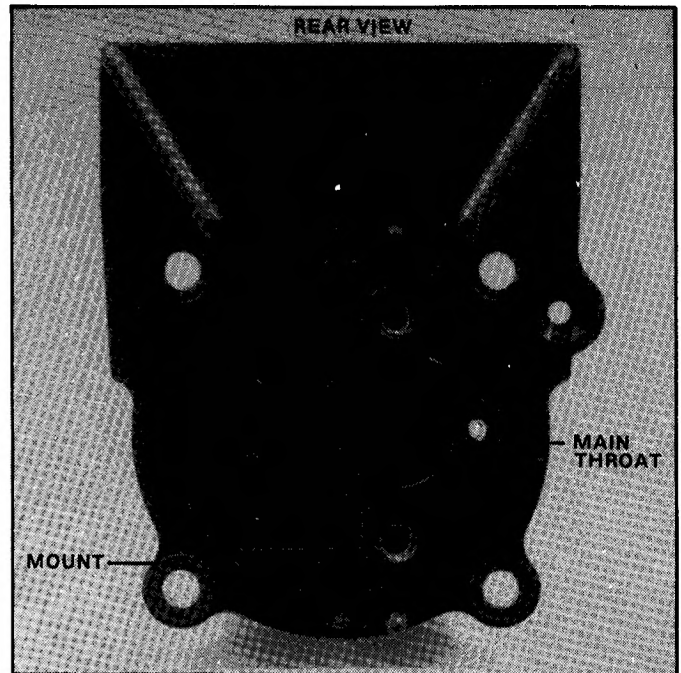
1. Filter Screen
2. Needle Valve
3. Metering Lever
4. Metering Lever Pin
5. Metering Lever Spring

**B. Gasket/Diaphragm Kit**

1. Fuel Pump Diaphragm
2. Fuel Pump Gasket
3. Metering Diaphragm
4. Metering Gasket

Before re-assembling the carburetor onto the engine remember to inspect the carburetor mounting gasket. If any damage is suspected replace the gasket.

3.1 With the carburetor removed (Ref. section 2) remove the four screws from the rear of the carburetor mount. These screws have a thread locking material, but they can be used again for re-assembly. See Figure 3.1.



**FIGURE 3.1**

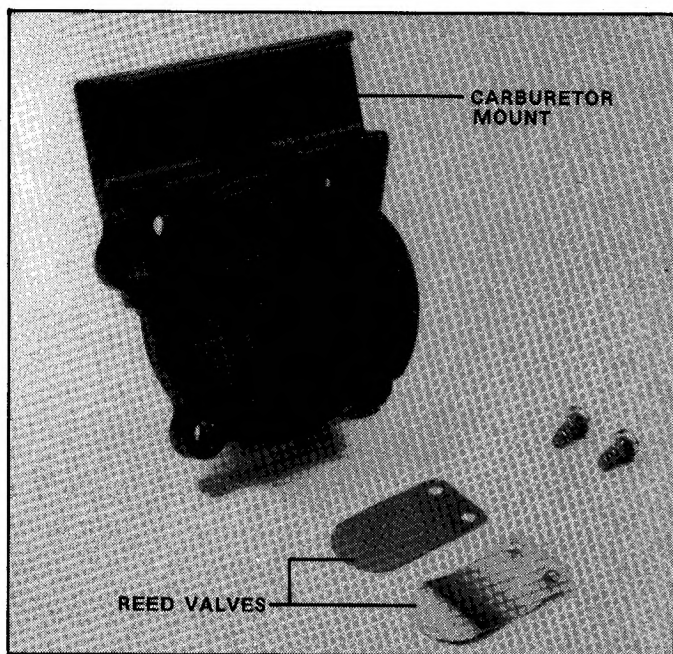
A. Remove the mount from the rear of the engine. Care should be taken not to damage the gasket.

B. Visually inspect the large center hole for excessive debris. If excessive debris is present disassemble the reed assembly from the carburetor mount for cleaning.

3.2 To disassemble the reed assembly from the carburetor mount remove the two screws in the forward end of the mount. Notice for re-assembly the arrangement of the outside backup plate bowed out and the inside reed plate bowed inward against the carburetor mount. See Figure 3.2.

3.3 Wipe the debris from the carburetor mount and reeds and re-assemble.

3.4 For final re-assembly of the carburetor mount to the engine tighten the mounting screws evenly in a criss-cross pattern to a final torque of 15 inch pounds.

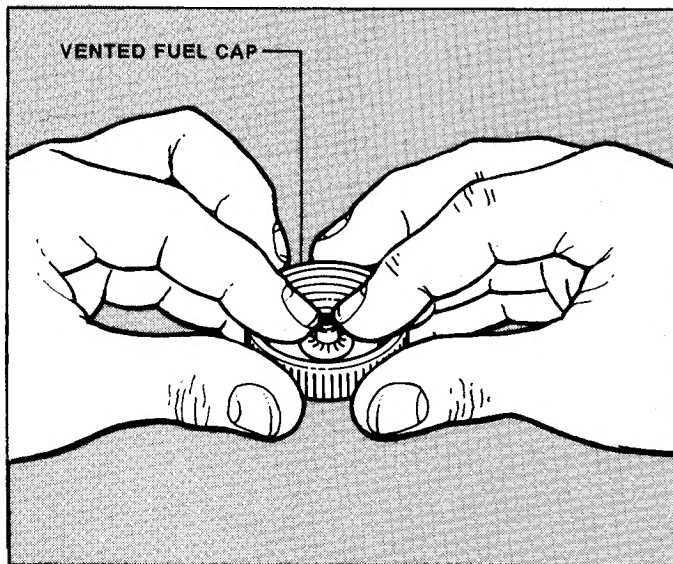


**FIGURE 3.2**

**Section IV  
Fuel Tank Assembly**

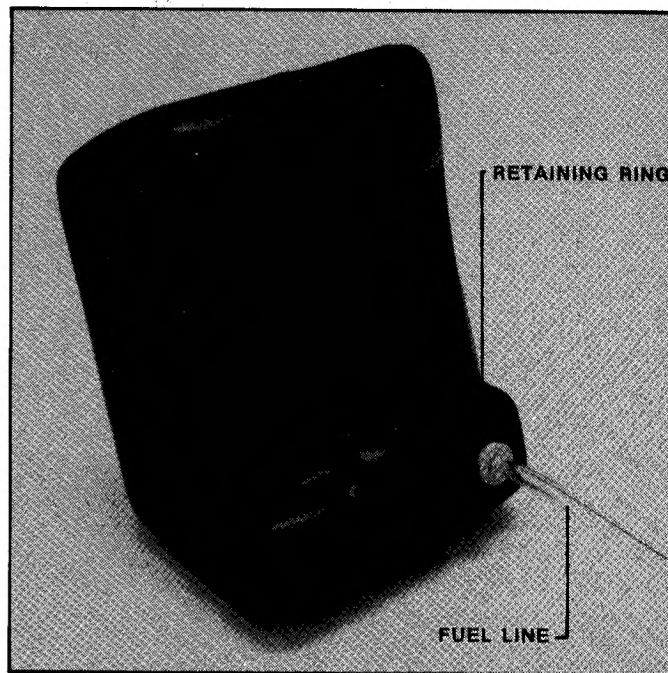
4.1 With the carburetor mount removed (Ref. section 3.1A) the fuel tank assembly can be lifted freely from the engine. The front and rear rubber mounting pads can be retained for re-assembly if no damage is apparent.

4.2 Remove the fuel tank cap. The cap is a vented cap and should be inspected. Looking at the inside face of the cap locate the end of the rubber vent. By squeezing the long ends toward each other, open the vent passage and inspect the opening to insure it is free of debris. See Figure 4.1.



**FIGURE 4.1**

4.3 The fuel line and filter assembly is disassembled from the tank by first carefully removing the retaining ring from around the fuel line. The end of the filter is left projecting out the bottom of the fuel tank. With the ring removed force the line and filter assembly inside the tank. Next reach inside the tank through the fill neck and pull the assembly free from the tank. See Figure 4.2.

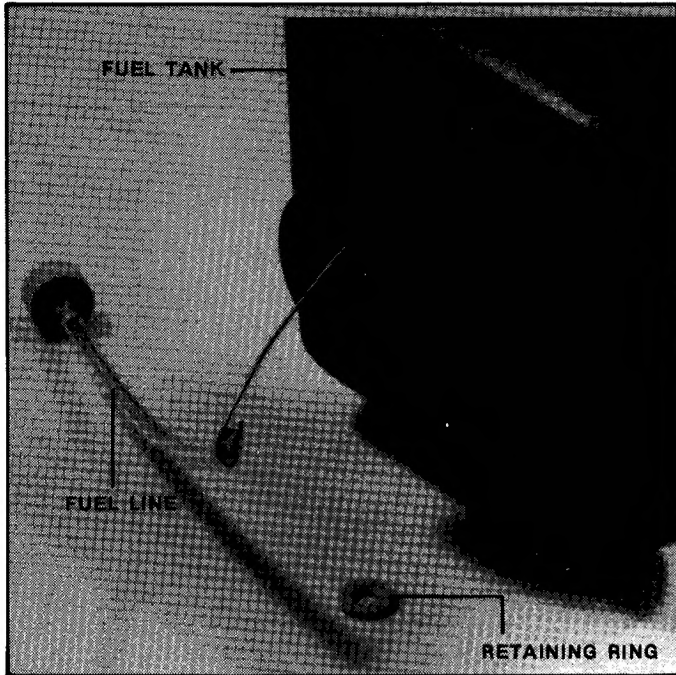


**FIGURE 4.2**

A. To test the line and filter assembly submerge the filter portion in a container of water and force air through the fuel line. A steady flow of bubbles should result.

B. For re-assembly the replacement fuel line and filter are already assembled together. To re-install the line and filter form a loop in a length of small diameter stiff wire and pass the loop through the bottom hole of the tank and out through the fill neck. Insert the tip end of the line inside the wire loop and draw the wire through the bottom hole seating the filter base inside the tank. See Figure 4.3.

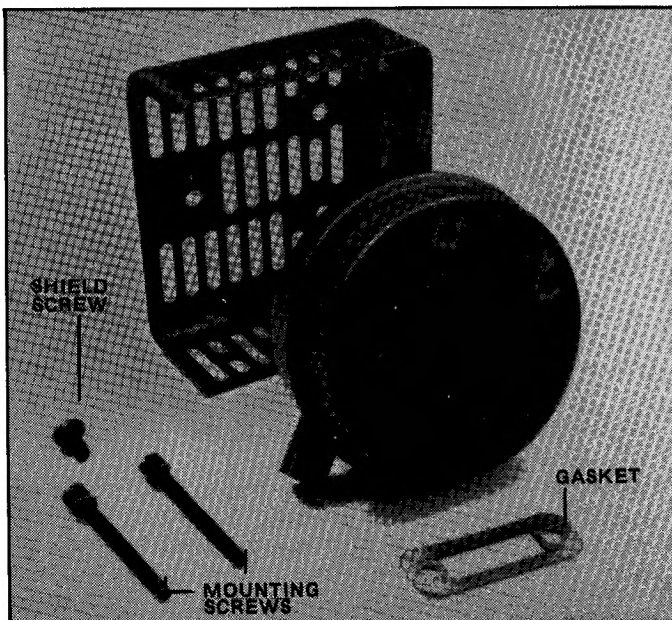
C. Re-install the retaining ring over the fuel line and firmly seat it against the bottom of the fuel tank.



**FIGURE 4.3**

**Section V  
Muffler and Shield**

5.1 The muffler and shield can be removed from the engine at any time without respect to any other engine components. Remove the two screws at the top of the muffler and shield. Remove the muffler and shield from the engine. Inspect the inlet and outlet of the muffler and the exhaust port of the engine for excessive carbon buildup. It is preferred that carbon build up be removed by using a piece of wood as a scrape. However, if necessary a metal object can be used but care should be taken not to scar the piston. See Figure 5.1.



**FIGURE 5.1**

5.2 The muffler and shield can only be separated after the two screws mounting them onto the engine have been removed. If necessary, to separate the shield from the muffler remove the last remaining screw.

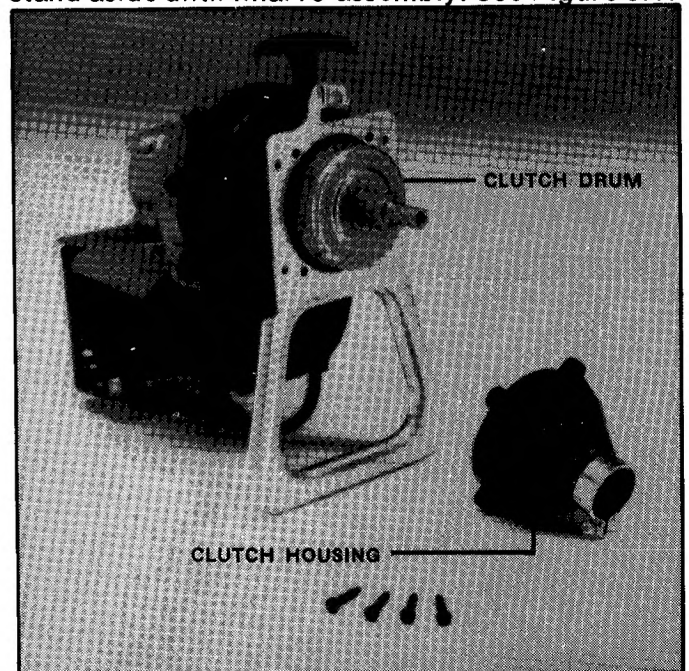
5.3 When re-assembling the muffler and shield onto the engine it is advisable to always use a new gasket. Apply thread locking compound to the screw threads and tighten the muffler screws to 56 inch pounds torque.

**Section VI  
Clutch**

SNAPPER's special service bulletin No.1985-C, dated 7-1-85, covers replacement of an undersized bushing in clutch drum P/N 42068. This undersized bushing may allow the clutch drum to slip forward, rubbing the plastic clutch cover P/N 42070. Bushing failures of this type will usually occur during the first hour of machine operation and can be solved by replacement of the clutch drum and clutch cover with the corrected parts. See 6.1 and 6.2 for instructions.

When reassembling earlier model clutch drums, apply thread locking compound to the crankshaft threads only - **not** clutch screw - Then install the clutch drum and tighten the screw to 150 inch pounds torque. The later model clutch drums have retaining screws fitted with lockwashers which eliminates the need for thread locking compound.

6.1 Remove the four screws from the clutch housing. Leave the loose screws inserted into the housing and set the clutch housing and engine stand aside until final re-assembly. See Figure 6.1.



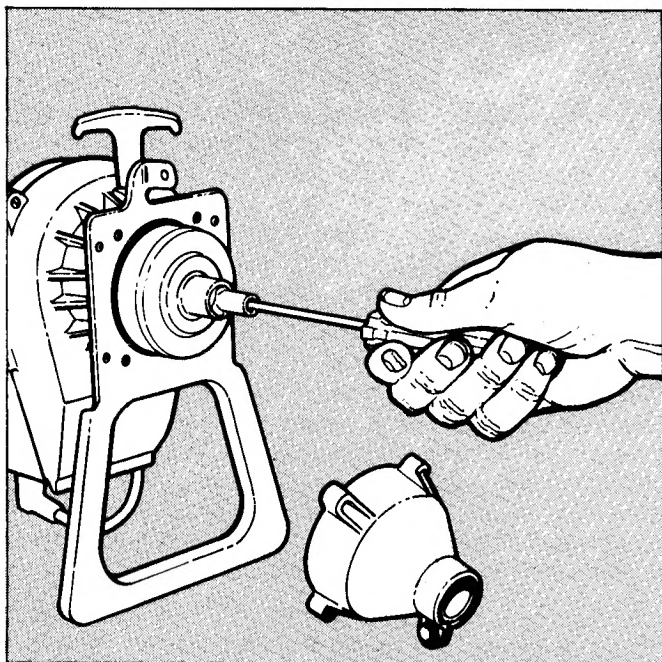
**FIGURE 6.1**

6.2 With the clutch drum now exposed insert a 3/16" standard screw driver such as a Stanely No. 1008-8 or equivalent into the drive shaft hole and loosen the



screw. The screw is retained inside the drum, but will come free from the engine shaft. Lift the drum off and inspect the inside for any wear on the clutch surface or the center bearing. See Figure 6.2.

A. For re-assembly use thread locking compound and tighten the screw to 150 inch pounds torque. Note: Later model clutch drums use a lockwasher on the screw and do not require this compound.



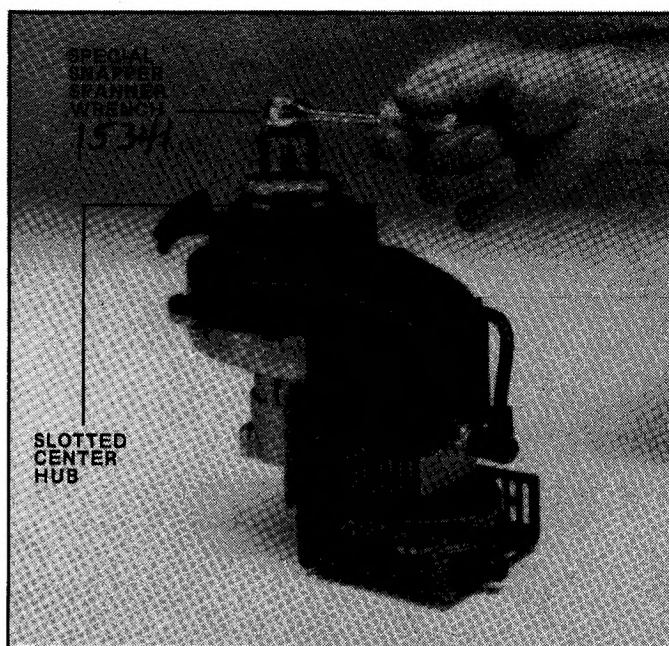
**FIGURE 6.2**

However, if using thread locking compound, it should be used on engine shaft threads only—**NOT** on clutch screw— it will lock head to drum.

6.3 The clutch shoe assembly is removed as a whole unit and should never be taken apart. With Special SNAPPER Spanner Wrench inserted into the center hub, tap the wrench handle sharply in a counter-clockwise direction. Care should be taken not to scar the engine shaft. Remove the assembly and inspect for wear. See Figure 6.3.

Note for re-assembly the outside face of the clutch shoe assembly is marked "OUT". Hand tighten only.

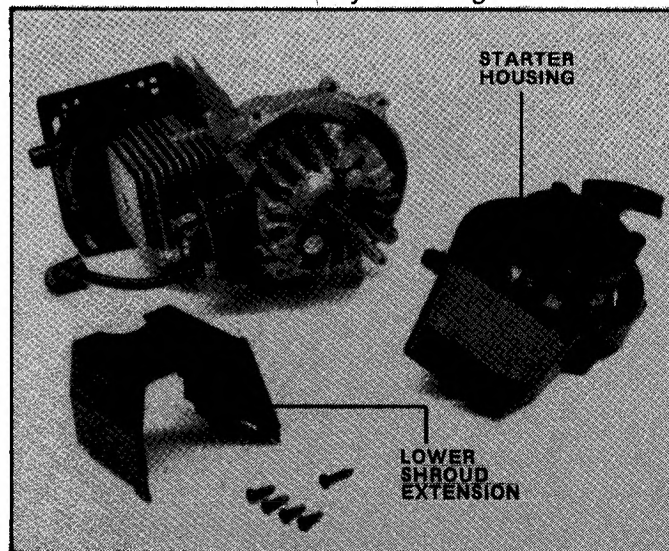
6.4 If either the clutch drum or the clutch shoe assembly show excessive wear or are of questionable condition replace both with new parts.



**FIGURE 6.3**

#### **Section VII Recoil Starter Assembly**

7.1 With the clutch assembly removed from the front of the engine (Ref. section 6) remove the four screws from the upper perimeter of the starter housing and the one screw from the lower center retaining the lower shroud extension. Set the lower shroud aside until final and re-assembly. See Figure 7.1.

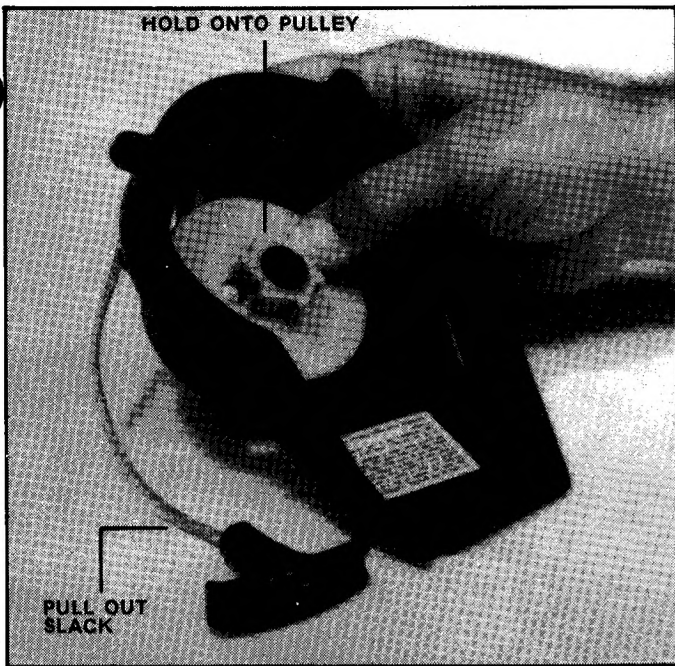


**FIGURE 7.1**

A. Lift the starter housing from the engine. Pull the starter rope to check for proper pulley and recoil spring function and inspect for worn or frayed rope.

7.2 If repair is required, remove the screw and pulley retainer from inside the housing. Carefully lift up on the pulley. If the recoil spring is being lifted with the pulley replace the pulley to its position. Pull the rope handle out a few inches. Hold the pulley from recoiling and drop the rope free. See Figure 7.2





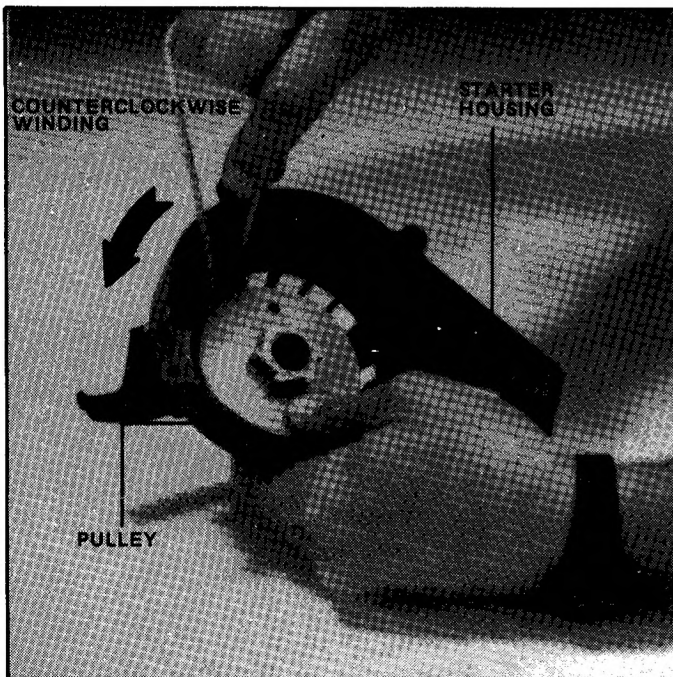
**FIGURE 7.2**

Continue holding the pulley and work the slack rope to the inside of the housing and unwind the rope from around the pulley. See Figure 7.3.



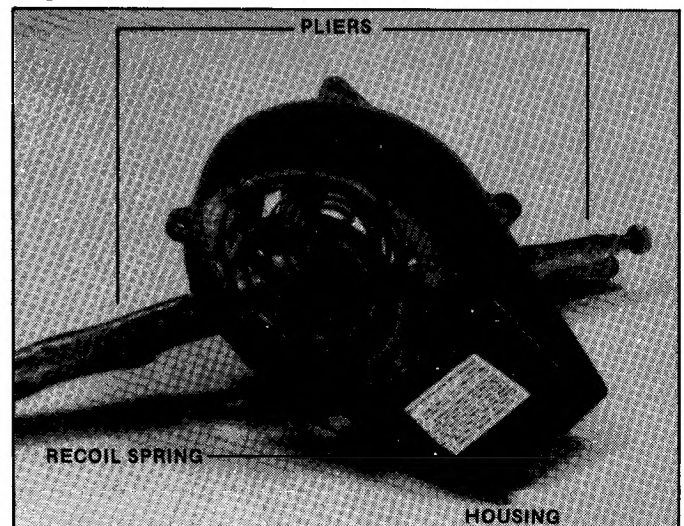
**FIGURE 7.4**

A. If the recoil spring does come out of the housing it can be re-installed using two pair of locking pliers such as vise grip, or equivalent, small enough to insert through the side louver openings of the housing. Remembering that the spring winds a clockwise direction from the outside winding working inward. Place the hooked end of the spring around the post inside the housing. Insert one of the pair of pliers through the side louver of the housing, across the top of the post and extending approximately 3/8 inch to the inside. Clamp the pliers firm but not tight enough to damage the housing. Now locate the second pair of pliers directly across on the opposite side and clamp them firm, allowing to extend approximately 3/8 inch to the inside. Wind the spring one coil at a time placing it under the extended jaws of the pliers. When completely wound carefully remove the pliers. See Figure 7.5.



**FIGURE 7.3**

If the pulley still will not lift free repeat the procedure. With the pulley free from the recoil spring lift the pulley out being careful not to unwind the spring. See Figure 7.4.

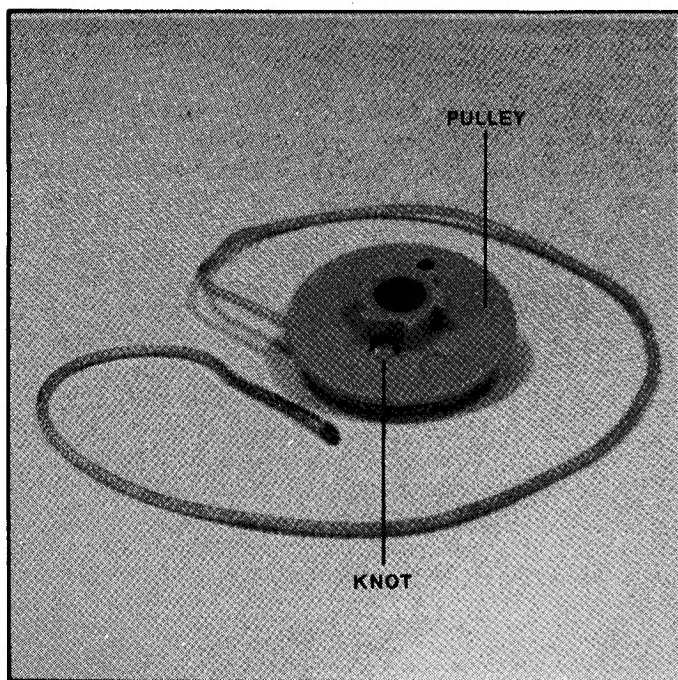


**FIGURE 7.5**

B. If it is necessary to replace the spring, the replacement is furnished pre-wound for assembly. Leave the retainer on the new spring to keep it wound and place the spring into the housing. Position the hooked end of the outer winding of the spring around the post inside the housing. Remember that the spring winds in a clockwise direction from the outside sending working in inward. With the spring in position carefully remove the retainer. Refer to Figure 7.5.

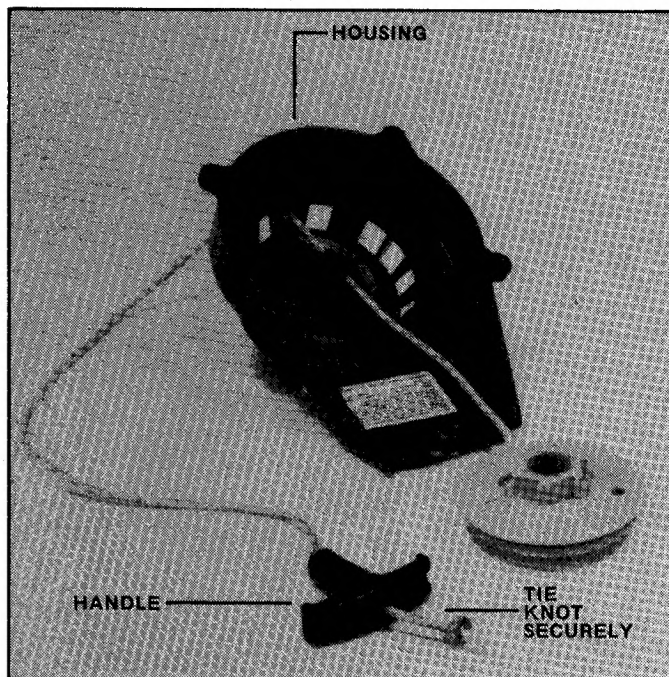
7.3 To replace the rope or the pulley remove the rope and pulley from the starter housing as described in paragraphs 7.1 and 7.2. Separate the rope from the pulley and replace with new parts as necessary.

A. To re-assemble the rope onto the pulley use a 33 inch length of 1/8 inch diameter rope. Insert one end of the rope through the larger hole in the side of the pulley and under the stop pin inside the pulley. Tie a knot securely in the opposite end of the rope then pull the rope through the pulley, seating the knot into the hole and against the stop pin. See Figure 7.6.



**FIGURE 7.6**

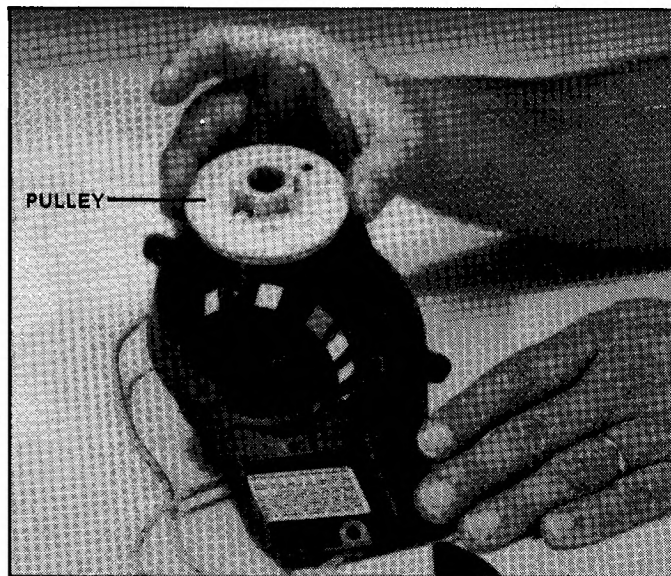
B. Insert the free end of the rope through the guide hole of the starter housing from the inside of the housing. Thread the rope through the starter rope handle and tie a knot securely. See Figure 7.7



**FIGURE 7.7**

C. If the starter rope has simply come untied inside the pulley it can be re-installed in reverse order to that mentioned above.

7.4 With the starter rope and pulley together and the rope through the guide hole of the starter housing apply a small amount of grease onto the top face of the recoil spring and onto the center shaft inside the starter housing. Turn the pulley so the six teeth are facing up and place the pulley down onto the housing shaft. If the hub of the pulley will not drop freely into the recoil spring use a small screw driver and while applying slight downward force on the pulley reach through the side louvers of the housing and under the pulley. Pull the inside coils of the spring from under the pulley hub. See Figure 7.8.



**FIGURE 7.8**



## Section VIII Switch and Ignition Module Assembly

**NOTE:** Since condition of ignition module is more easily checked while engine is assembled, all other probable causes of weak spark (such as faulty or broken wires, fouled plug, etc.) should be checked before any engine disassembly.

8.1 Disconnect switch from the ignition module. Test the switch for continuity and function with an ohm meter or continuity tester. See Figure 8.1



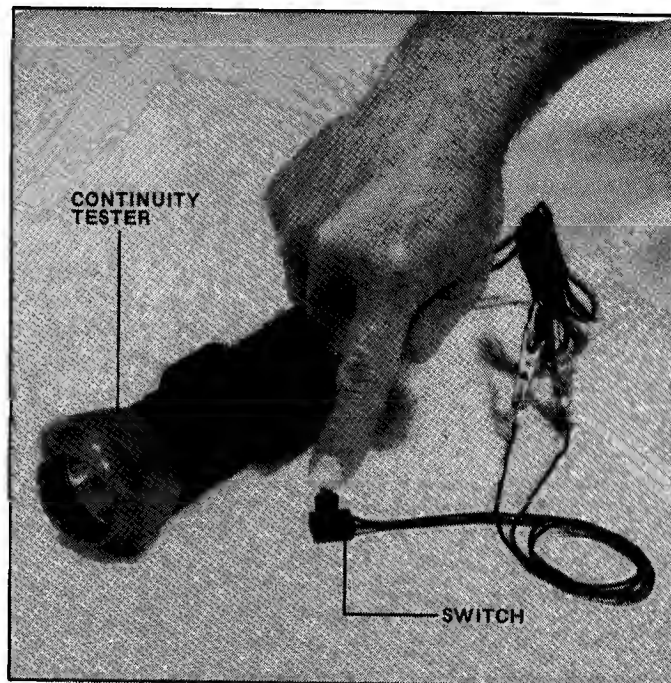
**FIGURE 7.9**

A. If the rope does not completely retract pull the rope handle approximately 8 inches and hold the pulley to prevent it from recoiling. Pull the slack rope to the inside of the housing and wind the pulley one additional turn. Pull the slack rope to the outside of the housing and slowly release the pulley. Refer to Figure 7.2.

B. With the recoil tensioned enough to completely retract the rope pull the rope handle until all of the rope is extended. Hold the rope to prevent it from retracting. Continue to hold the rope and attempt to turn the pulley clockwise. If the pulley will turn, the spring tension is correct. If the pulley will not turn, the spring tension is too tight; un-wrap one coil of rope.

C. If the spring is properly tensioned but will not completely retract the rope check for pulley drag, rope too long or recoil spring too weak.

D. For final re-assembly of starter housing onto the engine the mounting screws should be tightened to 40 inch pounds torque.



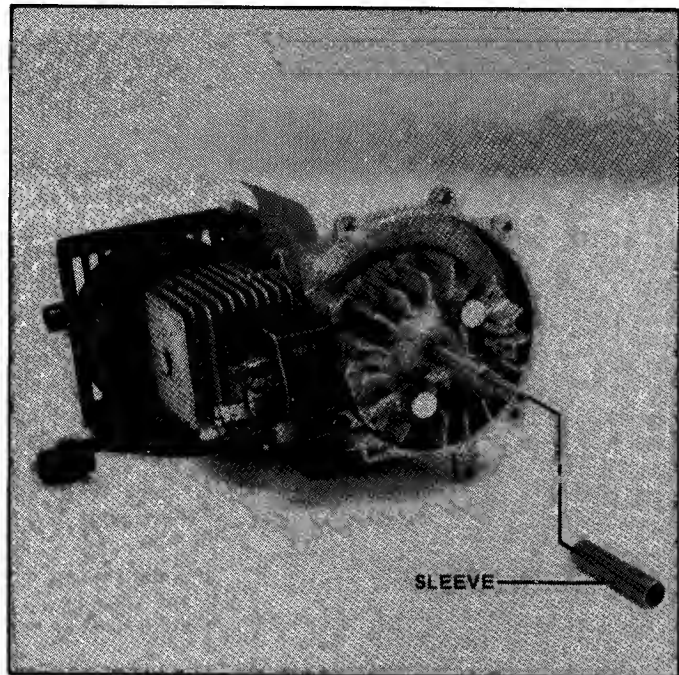
**FIGURE 8.1**

8.2 Remove the two mounting screws from the ignition module and set the screws and module aside until final re-assembly. Note that the ground tab for the switch is mounted under one of the module mounting screws.

8.3 For re-assembly of the ignition module align the flywheel magnets with the module and adjust the air gap to .010 inches. Tighten the mounting screws to 28 inch pounds torque.

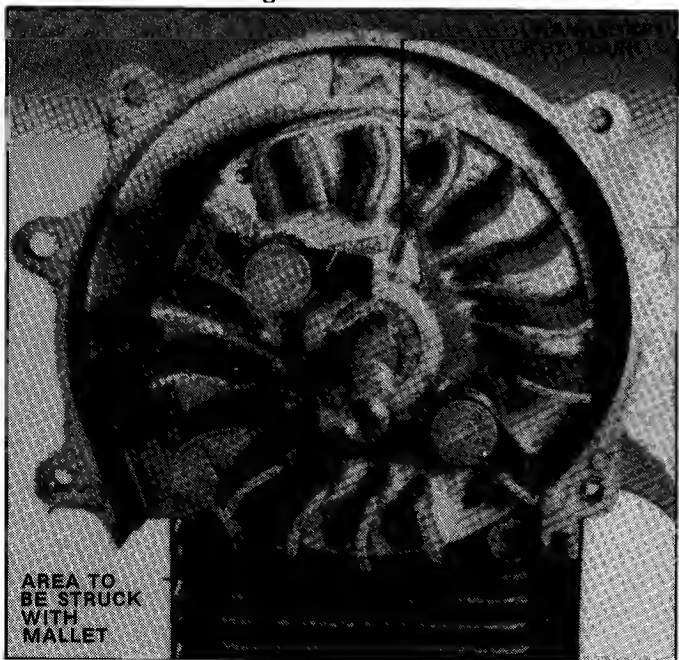
## Section IX Complete Block Assembly

Remove the crank shaft sleeve and set it aside until final re-assembly. See Figure 9.1.



**FIGURE 9.1**

9.2 On top of the flywheel over the area of the magnets is an elongated mark that indicates the location of the crank shaft key. Rotate the flywheel until the mark is opposite the ignition module mounting area. This positions the flywheel counter weight at the module area. Using a soft faced mallet sharply tap the side of the counter weight at a place directly across from the key to loosen the flywheel from the crank shaft. See Figure 9.2.

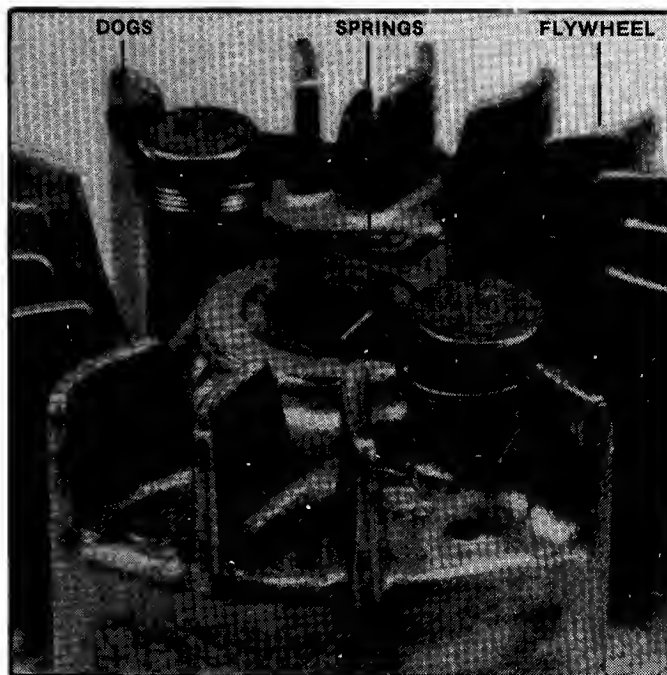


**FIGURE 9.2**

A. Do not strike the side or the end of the crank shaft. Severe damage might result to the shaft or the internal bearings.

B. For re-assembly the flywheel need only be set over the crank shaft aligned with the crank shaft key.

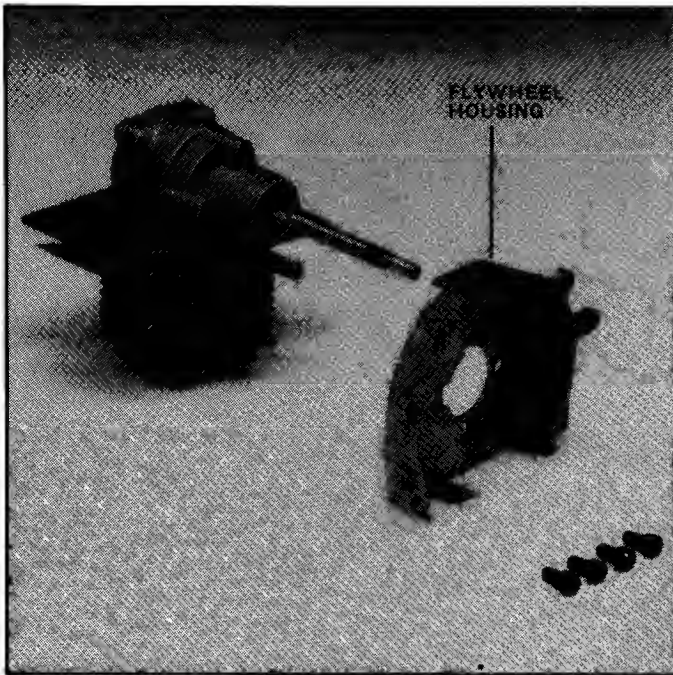
9.3 On top of the flywheel are two starter dog assemblies. These are permanently assembled onto the flywheel and should never be removed. However the dog springs can be replaced if necessary. With the hooked end facing up place the spring over the pin and on top of the dog. Pass the lower end of the spring under the dog and lift the spring end over and past the flywheel fins in a clockwise rotation. Continue this procedure until the whole spring is under the dog. From the under side of the dog hook the hooked end of the spring around the dog. Place the lower end of the spring in front of the flywheel fin adjacent to the dog. See Figure 9.3.



**FIGURE 9.3**

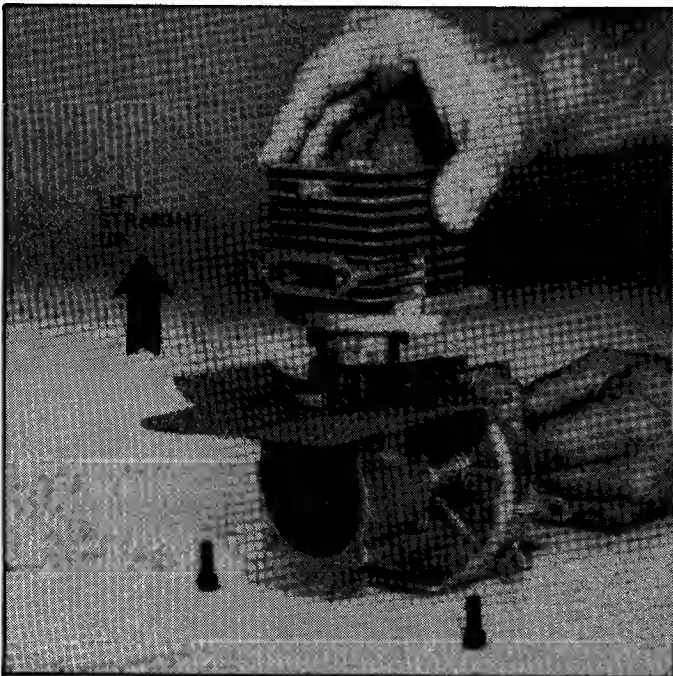
9.4 Remove the crank shaft key from the crank shaft and the four screws from the flywheel housing. Lift the flywheel housing off the crank shaft housing and set these aside until final re-assembly. For re-assembly tightened the housing mounting screws to 120 inch pounds torque. See Figure 9.4.





**FIGURE 9.4**

9.5 Remove the two screws from the crank case housing and separate the crank case assembly from the cylinder block by pulling in a straight line direction. Avoid a twisting motion; this could cause the ends of the piston ring to scar the cylinder wall. For re-assembly tighten the crank case to cylinder screws to 120 inch pounds torque. See Figure 9.5.

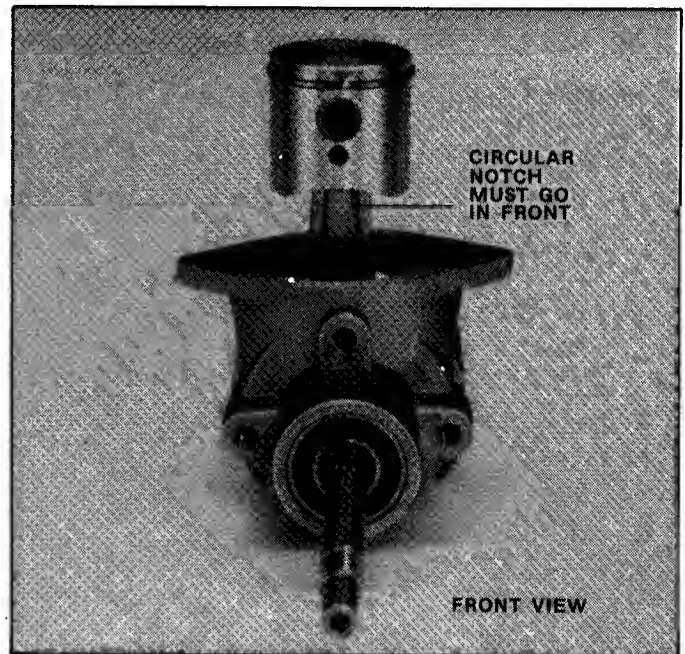


**FIGURE 9.5**

A. Inspect the cylinder for scars or signs of excessive wear. Clean out excessive carbon and gasket residue. In all cleaning, care should be taken not to scar the surfaces.

B. The cylinder bore inside should be 1.3790-1.3805 inches, measured top and bottom at three points around the circle of the bore. Note that the cylinder is tapered at the extreme bottom for ease of installing the piston assembly. Measurements must be taken above this taper for accurate readings.

9.6 Remove the piston and connecting rod assembly from the crank shaft assembly. Note for re-assembly that the piston skirt has a large circular notch in the forward area for crank shaft counter weight clearance. Clean excessive carbon from the piston and inspect for scars or signs of wear. Inspect the piston ring for chips, cracks or signs of wear. Insure the ring is free moving in the ring groove. Be sure the ring gap is located at the ring stop pin in the piston. Do not disassemble the piston and connecting rod; it is a factory assembly. Inspect the bearings for any feeling of tightness or roughness.



**FIGURE 9.6**

A. Refer to the dimensional specifications chart in section 10. If the piston ring is within specifications but the ring to groove is not, replace the piston and connecting rod assembly. The piston and connecting rod assembly is furnished with a new ring installed.

B. If the piston ring gap is within specifications but the cylinder end gap is not, replace the cylinder with Snapper P/N 42024. The cylinder is furnished with a new cylinder gasket and two new mounting screws.

C. If the piston ring is not within specifications replace with a new ring.

9.7 The crank case assembly is a factory assembled unit and should never be dis-assembled. However, individual parts for this assembly are available for parts sales.

## Section X - CHARTS

Inspect the connecting rod end of the crank shaft for any signs of wear, scratches or dark burn spots.

For additional information to determine the serviceability of internal engine parts see the dimensional specifications chart below.

### Dimensional Specifications Chart

Crankshaft run-out	.010
Piston diameter	1.375-1.376 inches
Cylinder bore diameter	1.3790-1.3805 inches
Piston ring width	.580-.680 inches
Piston ring thickness	.0615-.0625 inches
Cylinder / ring end gap	.0670-.0770 inches
Ring / piston groove side clearance	.005 inches max
Engine compression	90-120PSI

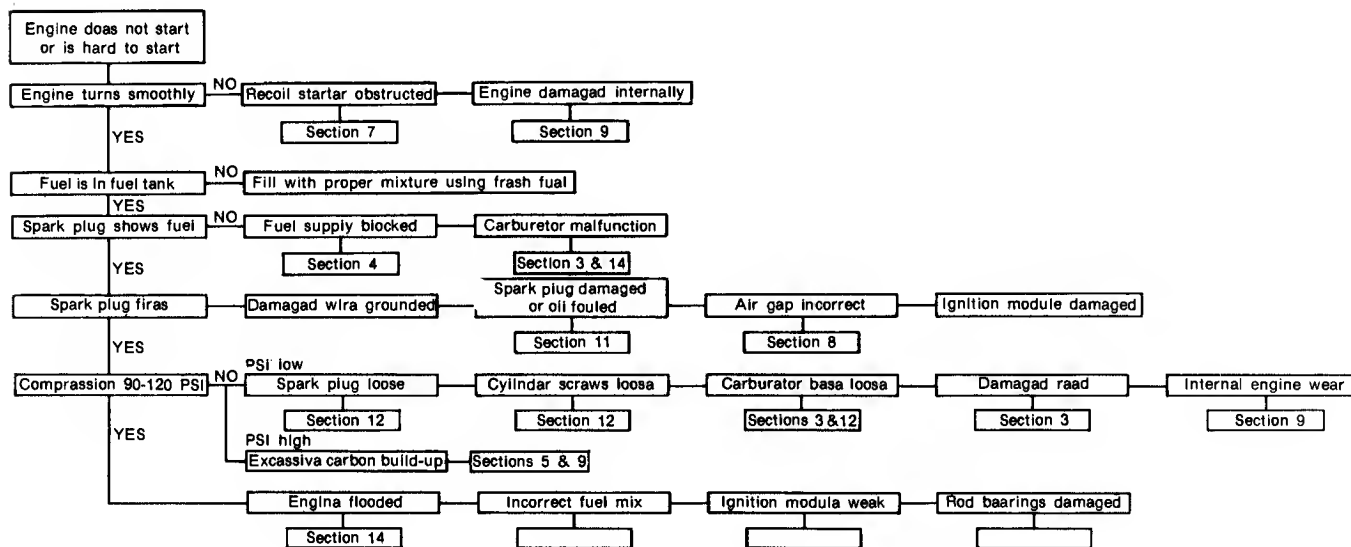
### Tune-up Specifications

Ignition module air gap	.010 inches
Spark plug gap	.025 inches [Champion DJ8]
Engine idle speed	2800-3400 RPM
Engine high speed	6800-7200 RPM
[RPM readings taken with Snapper Bump head installed and lines fully extended to line cutter.]	

### Torque Specifications Chart

Cylinder head bolts	120in. lbs.
Muffler screws	56in. lbs.
Carburetor mount mounting bolts	15in. lbs.
Choke base mounting screws	40in. lbs.
Flywheel housing bolts	120in. lbs.
Ignition module mounting screws	28in. lbs.
Starter housing screws	40in. lbs.
Clutch drum retaining screw	150in. lbs.
Spark plug	150in. lbs.
Clutch shoe assembly	Hand tight

## ENGINE TROUBLESHOOTING



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# Service Manual for

# **SNAPPER**<sup>®</sup>

## Model 310 & 311 Trimmer Engine

**SNAPPER POWER EQUIPMENT**

McDonough, GA • 30253

